Abstract

During the intubation process, forces greater than 39N applied onto the laryngoscope can cause damage (Carassiti et al., 2012). It may affect the teeth, vocal cords of patients, perforate the hypopharynx, or cause subcutaneous cervical and facial emphysema (Berry et al., 2013). Currently, there are limited ways to protect the patient’s mouth from excessive force. Also, available solutions interfere with the procedure, and don’t offer full protection. Therefore, a force transducer that displays the force being generated is beneficial. The objective of this device is to bypass the need for protection by alerting the user of excessive force. When the tongue’s soft tissue contacts the sensor on the laryngoscope, the device elicits sensory feedback. The physician can then see how much force he is exerting and adjust accordingly. This system would consist of a 3-D printed adaptor fitted onto a traditional Macintosh laryngoscope blade. Force sensing resistors (FSRs) would be mounted on the adaptor and connected to a feedback circuit that would provide a sensory signal for the user.

Introduction

Laryngoscopes are devices used for intubation, and to observe the laryngeal area. When forces greater than 39N are applied by technicians, damage may occur in the patient’s throat, tongue, and teeth. Current devices have no way of measuring the amount of force being generated. Therefore, our project focuses on developing a feedback system to prevent damaging force due to laryngoscopy.

Methods | Design | Analysis

Calibration

Adaptor Design

Final Prototype

Results

Conclusion

Research has indicated that 39 N is the threshold for damage. Any exceeding force to an adult without underlying health conditions can lead to adverse effects, such as nerve, teeth and tissue damage. Current laryngoscope models lack feedback systems, which informs healthcare professionals of potential damage they may be inflict. Our device would fill a gap currently seen in the healthcare system globally.

- The chosen sensor for our product can measure the force between 0-50N.
- The 3D designed adaptor is thin and does not affect the intended use of the laryngoscope.
- The feedback transducer informs the user if damaging forces are being applied in the form of a sensory output.

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References
